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CRUSH

An Animated Thesis Film
by Tirumalaimuttu Shanmugam

Submitted in Partial Fulfillment of the
Requirements for the Degree of Master of Fine Arts in
School of Film and Animation
College of Imaging Arts & Sciences
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School of Film & Animation		
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ABSTRACT

“Crush” is a **3D Animated Short Film** about a kid who gets lost in his own world of imagination after any typical crush. JoJo, plays the protagonist in this film. He desires the attention of his classmate PoPo, to propose his interest towards her. After receiving a positive response from her, he gets lost in a dream world. When his heroic exploits in this dream state go awry, Popo loses interest in him. Before JoJo can gain insight from this experience he receives a wink from MoMo. Undoubtedly her attention will send him into another daydream.

PRE -VISUALIZATION

Story development

I decided to make a story based on a personal experience I went through during the script writing of this film. As a result, this project began as a dark film with a narrative structure. In the end, I decided to shape it into cute comedy. Initially it described the dark phase of an infatuation and the distorted thought processes of a destitute mind state. My thesis chair and some friends who were not interested in this story, helped me to dilute it until it became a comedy. I personally believe that the present comedy has still has the initial dark undertones.

Thumbnails and Storyboard

After the script was drafted, I drew thumbnails. These gave me insight into what scenes needed further development in order to convey JoJo's story. This preview of the written story allowed me to recognize flaws and rearrange the shot sequence to better visualize the whole picture. This process helped me to accept changes wherever possible to keep the film short, engaging and doable.

Storyboard is done after finalizing the shot arrangements in thumbnails. Some of the thumbnails were reused for storyboards. This stage is a further clarification to the story and a promise to proceed to the next step which is Animatic. A 2D animatic is done with these storyboard drawings to establish timing for each shot, transition between them and to get a rough idea about the length of the film.

Animatic and Initial 3D setup

After developing a rough outline of the story, I set up the scenes with low poly primitives. This step helped to fix proportions of the characters and set objects. Later, these low poly sets are replaced with high poly models.

Units and Global scale for a 3D project could be a lifesaver if it is determined at the beginning of the project to avoid surprises down the line. The story doesn't demand a wide resolution because the set is a closed environment with just two characters. So, I decided the final resolution of the film to be 1280*960, aspect ratio 4:3, square pixel.

Since I included some basic animation for the primitives, this step also served as a 3D animatic. The 3D animatic ended up being 1 min and 47 sec and the story was established. The final film is always going to be longer than the animatic, since changes in further stages can't be avoided. But from then on, changes were considered with restriction to the time limit.

CHARACTER DEVELOPMENT

JoJo

He is shy but naughty, talented but dumb, lost in his own world for just one reason "I am excited".

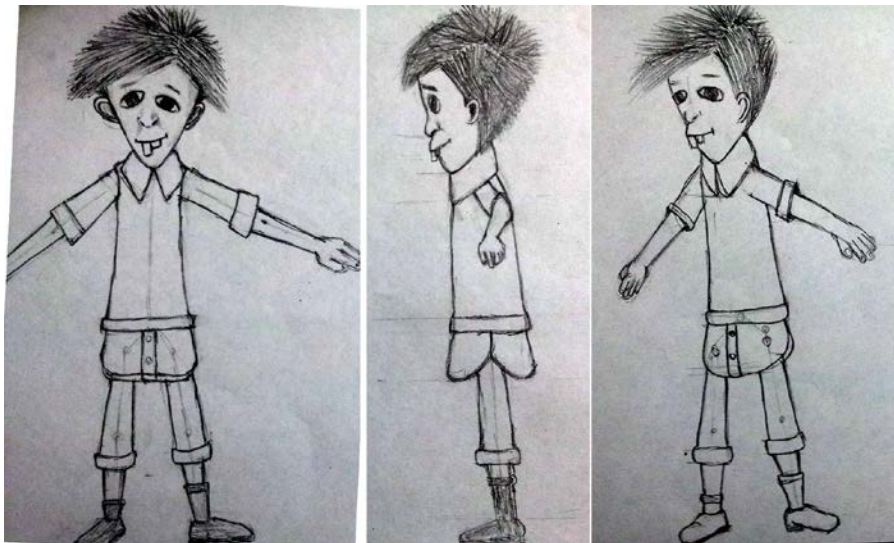


Figure 1

He is lean because he reflects me, so as his attire. But this hairstyle was preferred because it showed him mischievous. Later, I needed something else to narrate his shy characteristics. Those buck teeth not only served this purpose but also added a bit of cuteness to him.

MoMo

She is pretty, outspoken, loves excitement in any situation but if things goes weird she slides out from them.

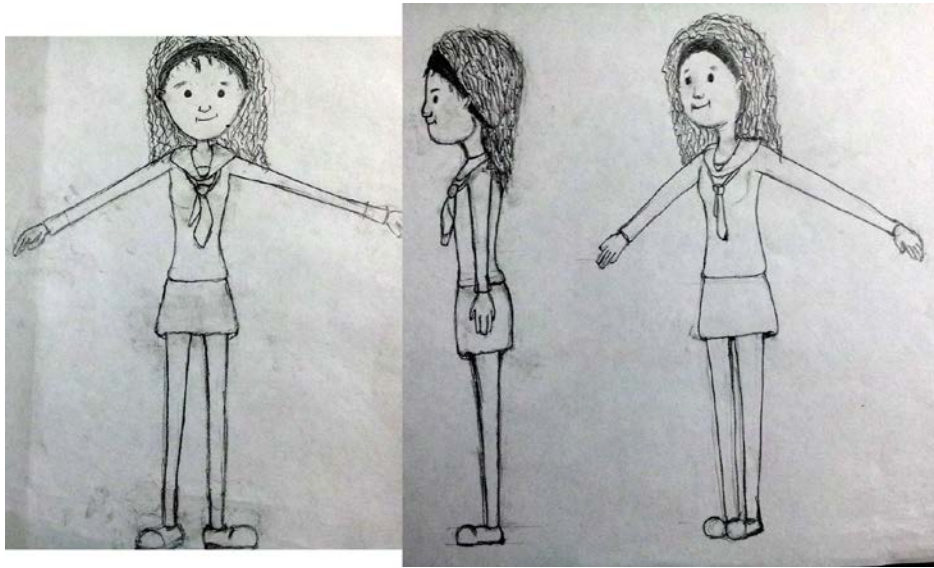


Figure 2

This character's style is the projection of natural beauty and confidence. I usually say girls who are tall with the round face, natural curly hair, and untrimmed brows stand out from the rest as style icon. They move stylized and have peculiar slang, no matter what language they speak. I also find them to be smart and decisive.

PoPo

Confused, scared, bored, looking for fun but at the same time, scared of it.



Figure 3

The character design for PoPo was drawn from a friend of mine. She was cute, intelligent, worried about her grades and always busy. I don't want to include her picture because she doesn't know PoPo is her caricature. But I will reveal her soon.

These designs were finalized after many comments and critiques, and several rounds of changes and tweaks.

I decided to sculpt these characters in Zbrush and then re-topologize because the world of digital sculpting is tempting. Zspheres and Dynamesh were used to get the basic form. Standard, Move and Inflate brushes helped to sculpt details for face and torso. Hands were separately sculpted and attached to the arms. Clothes were extracted from body mesh and then refined for respective look. Accessories like shoes and tie were added later. The sculpted characters are here.

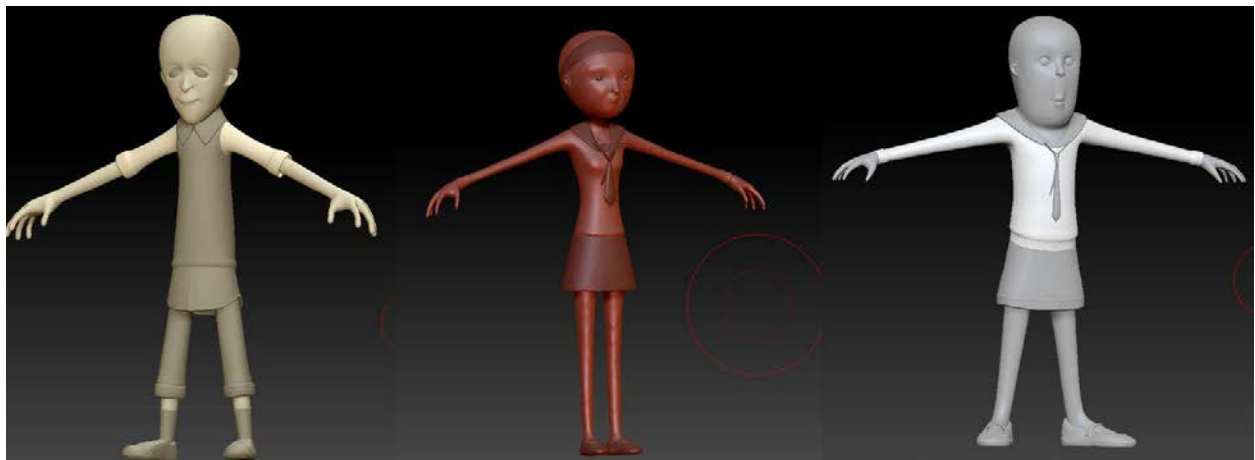


Figure 4

3D coat provided handy tools to retopologize high-poly sculpts. As expected, exporting sculpts from Zbrush as “.obj” and then importing a reference mesh in 3D coat is the first step. Before that, some line flow references to end up in an aesthetically pleasing deformation.

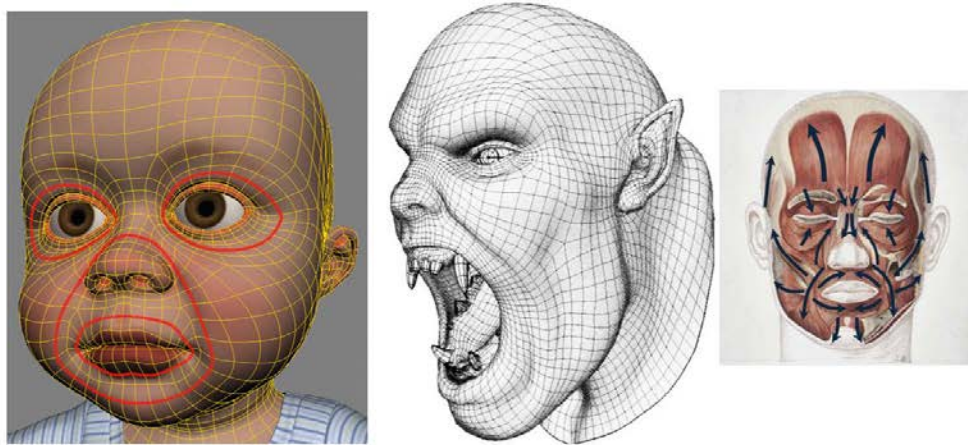


Figure 5

Re-topologized models are shown below.

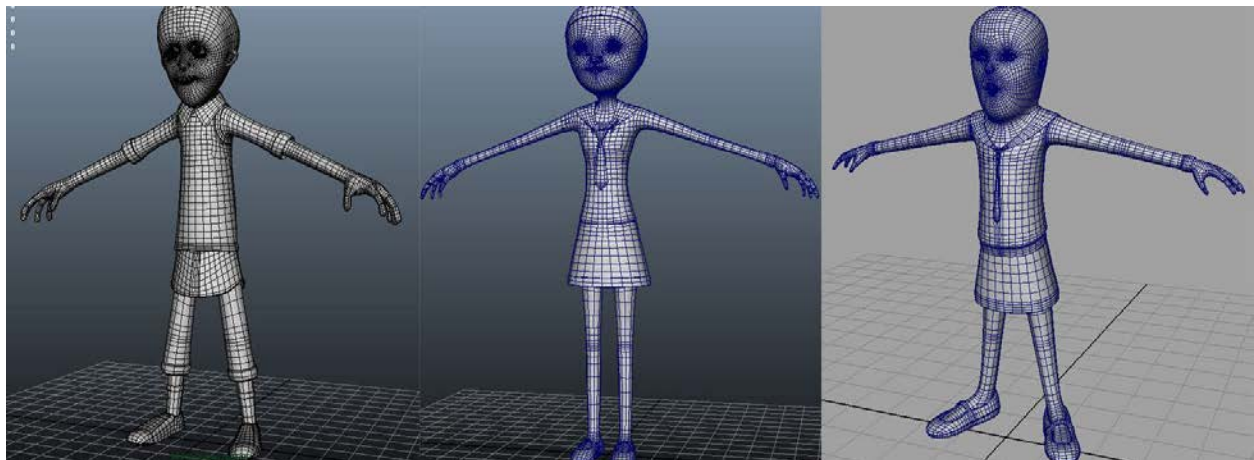


Figure 6

Models were tweaked further in Maya to get the lip and eye lash lines proper. More lines were added for fingers near joints for better deformation. Mouth cavity were also added for teeth and tongue placement. Hair and eyelids are yet to be done. The idea behind hair is to create a rigged one ready to go for animation so it can wait for a while.

UV unwrapping and texturing

I preferred one to one projection of the surface for character's face so automatic mapping in Maya was used and stitched UV's. Some of the cylindrical shapes like shirt, sleeves and shoes also were done in Maya using cylindrical Mapping. 3D coat was used for the rest of the accessories and fingers to make the job simpler and faster.

Texturing could be the most challenging part in this film because the concept art had a painterly style. Texture painting over the models could be the best way to imitate this style. I decided to go with Photoshop for its wide variety of brushes and the ease of use rather than Zbrush. Photoshop 3D tool is used to texture paint props and characters. Before Character Texturing, some prop were textured to get some practice for the brush stroke to match the style of the concept art. 2K maps were used for maximum resolution and the resolution size varied depending on the objects proximity to the camera.

Here are the characters with just textures (No shaders)



Figure 7

RIGGING AND ANIMATION

Rigging is the first step to see characters deform. A very normal bone setup is done for the models with specific names for every joint. The rig is created with an autorig called “bipedSetupUI.mel” which I developed for my independent study of tool development. This autorig is flexible enough to animate any kind of biped characters. It has general features like IKFK setup, stretchy bones, dynamic parenting, automated shoulder

solving, ribbon spine, finger setup with inbuilt poses and secondary controls to correct shapes for volume preservation.

It's my belief that the keyposes of characters will be strong only through spine and finger poses. So a flexible rig for spine is preferred, in this case it is ribbon spine. The autorig also creates a selection set which has the joint names to be bound to the mesh.

With selecting these joints and the required mesh, a Smooth bind is done with classic linear method and low max influence value. Max influence value is increased accordingly during paint weights. Also, skinning method is changed to dual quaternion because it preserves volume better than classic linear, especially in places like elbows, knuckles, knees, skipping the step of making corrective shapes. The skin weights is initially done for body mesh, later copied to clothes mesh using "copyskinweights" from skin menu. The clothes exactly followed the body deformation causing no interpenetrations because of matching line flows between them. Also they shared same skinCluster settings.

Facial rigs

MoMo's face was rigged first with joints hooked with distance nodes and utilities. There were no setdriven and corrective shapes involved to get the correct deformation.

Although it needs further tweaks to be an extensive rig, I am moving to the next character because she has minimal facial expressions in the film.

JoJo and PoPo are rigged with the combination of joints and wire deformer. The reason for wire deformer is, it can be controlled through paint weights and its vertex level attributes like rotation, scale, drop-off distance provides precision, resulting in an extensive variety of facial expressions. The number of wires has to be kept minimal to keep the rig from slowing down Maya. Eyebrows, lip lines combined with mouth open/close and eye blink are important to convey the facial expression. So the wires are placed on these areas. Each wire has different values for vertex level attributes and paint weighted accordingly to provide unique deformation. A long straight wire is used along the face for global deformation to shape the entire face. The nose and cheeks were taken care by Joints. The mouth open/close is the combination of joints, corrective blendshape and setdriven keys. Separate joints for both upper and lower lids took care of eye open/close and fleshy eye deformation.

Hair rig and animation

Initially, Fur setup was planned for JoJo and MoMo, but considering the time limit the decision was switched to polygon hairs, which opens up options for stylized hair setup with less render time. Modeling hair and then rigging it would be time consuming, instead, creating an automated hair system would help to both create and animate hair could be intuitive. It also provides option to switch between manual keying and simulation.

The idea behind this automated hair system is to

- create a straight curve and circle under a locator.
- use makelive on mesh surface to position the locator on the scalp.
- extrude polygon using this curve and circle.
- use the scale, rotation, length attributes of the extrude history and vertices to shape the mesh as hair.
- then create FK/IK spline controls on it to animate.
- IK spline can be converted to dynamic curve after basic animation is done.
- hook the hair control rig to the character skeleton rig so it moves along with the global control.

A bunch of MEL script is written for each step explained above and a UI is developed with necessary hints for easy execution of this tool. The hair rig provides every possible functionality to animate the hair mesh. The hairs were split into primary animatable hairs and secondary hairs which blends between the primary ones.

Unfortunately, I couldn't animate hair for JoJo due to tight deadlines, but managed to animate for rest of the characters. Also, PoPo has a completely different set up as her hair is modeled conventionally and rigged with FK rig.

Character Animation

I don't have any particular style in mind. But the idea behind animation is to "hold Keypose". The transition between keyposes could be quick/slow depending on the mood of the character.

Since JoJo is the protagonist, he has the main role to build the mood in the film.

Holding the keypose helps to convey his expressions but it shouldn't affect his energy level which should be taken care of. PoPo falls under the same roof but her scary nature

about everything will definitely make her movement distinct. MoMo is more stylish and little slow than the rest. Detailed blocking is done for all the characters with timed keypose and extremes. In-betweens were done in later stages.

Initial blocking for MoMo was not so satisfactory because she doesn't have the pace and style. To fix this live references were observed in places like school coffee shop and corridor. The way girls swing their arms, time steps, smile and look are good inspirations to rework on MoMo. The result is much better the second time. Likewise, every character have gone through many steps of improvisation resulting in well blocked shots ready for in-betweens.

Prop animation and Dynamics

Prop animation in the film became an interesting one because of origami props. The dream world sequence has origami birds, pinwheels, arrows moving like swarm of fish in a foggy environment. Some of the props in the class are notebook and arrow.

Notebook with flipping pages is rigged with attributes to deform each page like a flexible paper. Combination of joints, wire deformer, blendshapes, and utility nodes made this rig possible. The rig also supports to tear a page separately from the flipping ones. He makes an arrow out of it which is rigged separately with multiple models of progressive folds from a regular paper to an arrow. Animating the visibility of these models with his fast moving arm created an illusion that he makes arrow.

The Dream world sequence involves lot of objects and animation. Waves of pinwheels, swarm of arrows, JoJo travelling on a sea horse, origami models floating in space, giant paper birds flying around, and fog reacting to all of the above. So, I am concerned about the render time even before starting animation.

Modeling and rigging necessary objects like pinwheels, arrows, seahorse and giant birds were done initially. Dynamics could be the best solution to multiply these objects using Instances and Sprites. Image sequence of spinning pinwheels were rendered separately with alpha channel and assigned as material to the sprite particles served the purpose of multiplying pinwheels. Also, the sprite wizard under particles menu took care of the expression for randomness, custom cycling for the image sequence. On top of this, a sine deformed is applied to the shape node of sprites to create wave effect.

Swarm of arrows is done using particle instances and fields. The particles were animated with the combination of an effect called “create curve flow” and fields like Newton, Turbulence and Uniform. This effect keeps the arrows to flow in a particular path with randomness created by these fields specified above. Some models like balloon were made to float in the environment using Instances again. These particles were given a very slight animation using fields like Air and Turbulence. Spinning movement of these balloon is achieved by manually rotating the base instance model in vertex level using clusters.

LOOKDEV

This project has two environments, a classroom and an origami world. My friend Serina Mo did the concept Art for both the environments. The concept art for the classroom shown below is developed from a reference view of the 3D scene file. Painting was done on top of the reference image in Photoshop.



Figure 8

The second environment is the dream paper world for which the concept art is shown below.



Figure 9

The bottom pinwheel layer is like sea waves and giant birds move like whales. The arrows are going to be small fish groups. There are plans to add paper bubbles, floating trees and sea horse to this environment.

Texturing 3D world

As discussed earlier in the character development section, texturing was done using the 3D layer tools in Photoshop. Color bleeding is the only issue while painting seams over the obj models directly. This is fixed traditionally by slightly moving the UVs in Maya. Low quality test renders of the classroom with no shaders and rough lighting is shown below.



Figure 10

Meanwhile, I would like to show some prop models which are done by Daniel Pise and Piper Hudson.

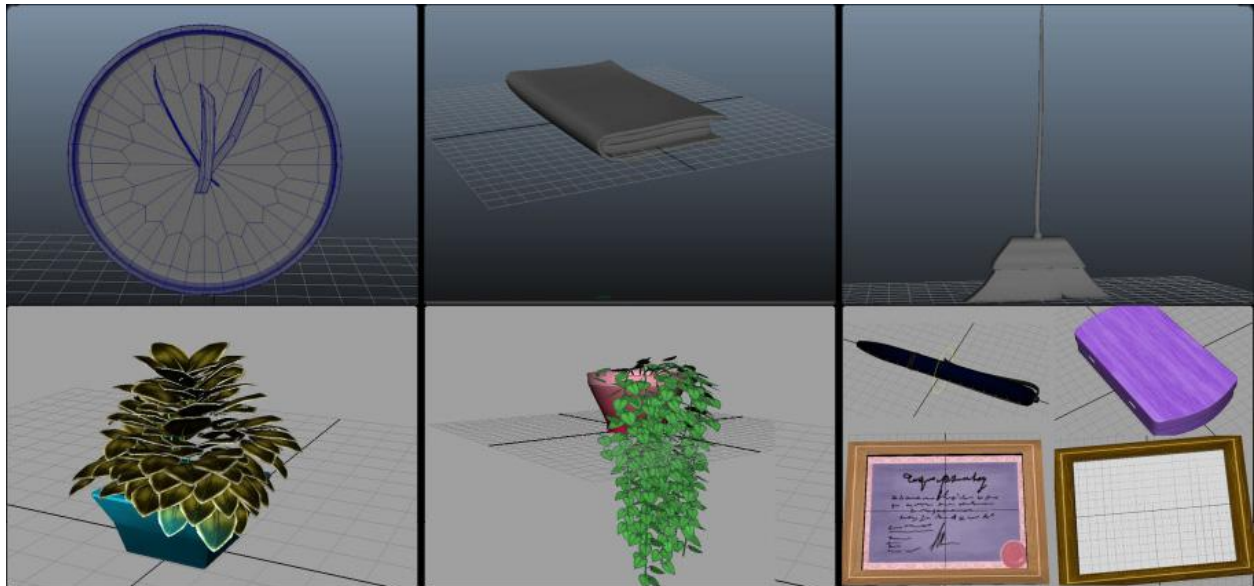


Figure 11

Shaders

Shaders are going to take care of the physical properties of the objects like how it is going to react to light, emit specular, reflection, refraction etc...Some of the shaders and its network are discussed in this section. The network is simple and shown below. The texture file node is hooked to a gamma correction node and its output is hooked to the

color node and bump node of the shader. The gamma correction node is used for “Linear work flow” which is discussed in lighting and rendering section.

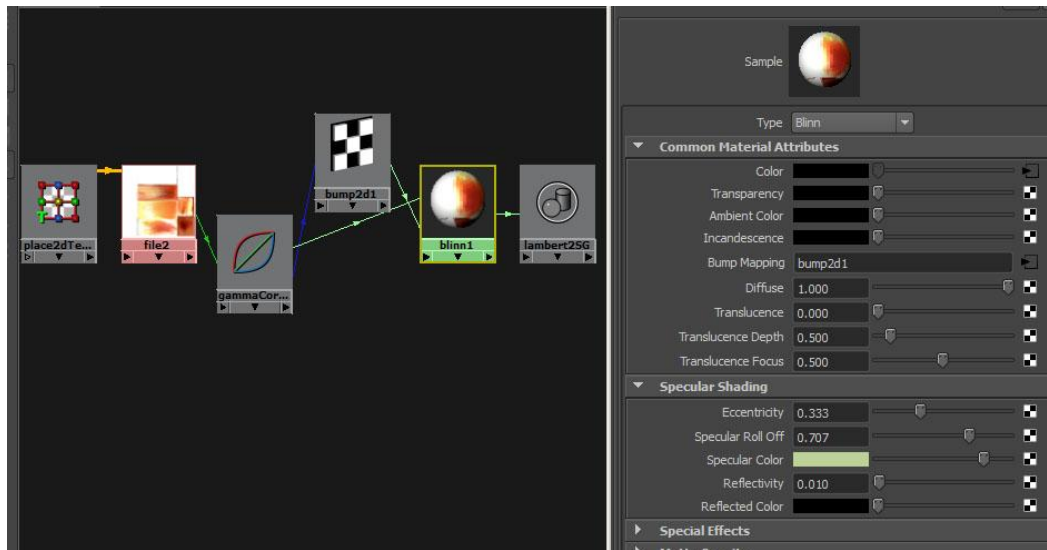


Figure 12

Sub Surface Scattering shader is used for character skin. The shading network is almost same as prop shaders with slight difference. The texture file is hooked to the Overall color and Diffuse color of the shader, a procedural leather texture is used for bump with tweaked settings. The bump is subtle to make sure the skin doesn’t look too realistic. The Ambient in SSS Shader has very small value to enhance the overall brightness of the skin. The diffuse weight is set to 1, so the UV texture doesn’t get lost in the scattering effect. The colors for scattering is chosen according to the light and mood of the environment. This film happens in evening light so mostly orange and reddish colors were preferred which includes specular color.



Figure 13

Surface shaders were used for paper objects as I want them to stand out in the film regardless of the lighting which is just a stylistic choice. I want them to look more flat with just the paper texture and no shading.

Since the Surface Shader makes everything flat, those random folding for the paper balls needs special attention as they should have a dark shade to look like a paper ball.

Sampler info node and ramp texture node were used to achieve this dark shading. The ramp settings helped to have a sharp darkness and also to maintain the flat look of the paper.

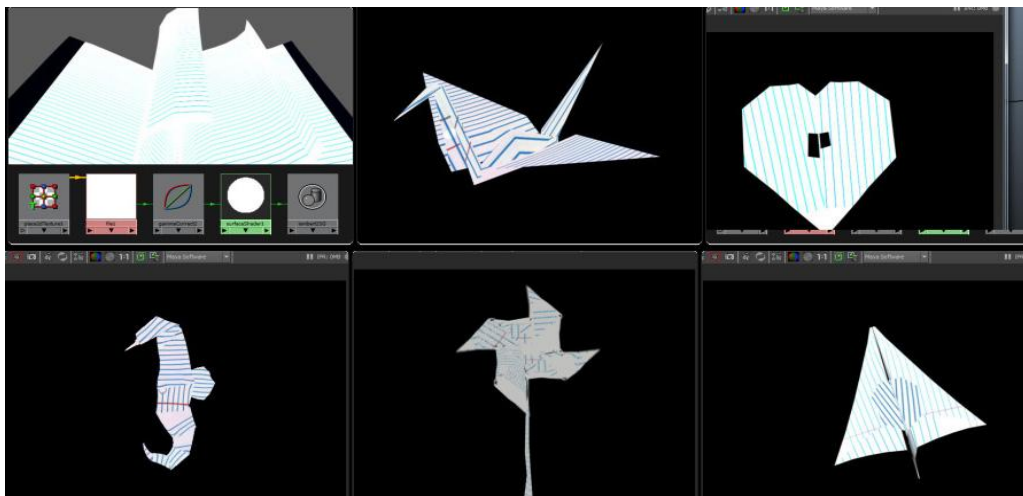


Figure 14

Light Rigs

To make sure the SSS works properly especially the backscatter, its good to rig the lights for each character as if it maintains its orientation to face the current camera in the shot. Three lights were used around each character. Two spot lights for shadow and fill, a directional light at the back. The reason for using directional light as backlight its output does not depend on translate values. When rigged with Aim Constraint to Aim the camera to be rendered, the scattering happens exactly as expected regardless of the position of character and camera. Lightlink window is used in every shot to hook these lights to affect the particular character.

Lighting, Rendering, Compositing

Lighting is interesting and challenging as it has to achieve the mood of the shot and moreover maintain consistency between shots. Before starting lighting I spoke to many people about general lights and its behavior, and how to achieve it in 3D. Some of the reference image given by my friend Yoshi and “linear workflow” by Ruudy were helpful. My thesis film needs an evening soft light with slight darkness. The darkness part is a personal choice. Few images shown below are good enough to study and achieve what is needed.



Figure 15

Linear workflow is done with the combination of Mentalray lens shaders and gamma correction node for all the shaders. “miaExposurePhotographic” is the lens shader used for every shot camera. The attributes for the lens shaders were tested to determine the

full black and full white value for the rendered image. The gamma correction value in Maya is 0.456.



Figure 16

One area lights was placed for each window which acted like a window source light. They were assigned different colors depending on the window glass color. Three Directional lights placed in the middle of the scene are for shadows and fill. The spotlight placed near the front door is an additional light source for the exteriors. Additionally, there are two directional lights, one to illuminate the ceiling and other to slightly bring out the brightness of the wall opposite to the window. The leaves shadows inside the class was achieved by having polygon leaves outside the windows. The idea of GOBO doesn't work because I needed a separate shadow pass for compositing. Indirect illumination in the room is achieved by Finalgather. Since the global scale of the project is small, a low accuracy value for Finalgather gave a nice result. A FG map is generated for every shot before the final render. A separate pass for indirect illumination is taken to get a good control over the room's brightness in Compositing. Apart from FG pass these are the different passes rendered from Maya for compositing in Aftereffects.

- Beauty pass
- ShadowRaw pass
- Indirect pass
- Specular pass
- Ambient Occlusion pass
- Reflection pass

- SkinDiffuseNoShadows (for characters skin)
- DiffuseMaterialColor (for characters eye and teeth separately)

Dream environment has to be setup with fog and also it should imitate under water.

While setting up the shot for lighting, the color of the concept art which is pink became questionable because I want the dream sequence look different from the classroom which is pink again. So I decided to render dream shots in blue which will be a nice contrast. Volume box is used for blue fog. The box had a noise texture connected to its transparency node. This texture is stretched in Y axis to get a vertical noise pattern for the fog. Also, its placedTexture node is rotated for different patterns. Apart from JoJo's lights which are just linked to him, there are two Spotlights and one Directional light in the scene. One Spot light was linked only to the fog and other took care of the foreground objects. The directional light illuminates background objects and gave little value to the foreground objects. A large sphere accommodates all of the above with a black surface shader.

Rendering this sequence took forever because of the object interaction with the fog. So the pinwheels are rendered in separate layer and added in the composite.

The Composite has

- beauty pass
- added pinwheel layer
- added fog
- separate diffuseNoShadow layers for skin, cloth and eyes.
- Adjustment layer for Color Correction.

To maintain a consistency in lighting for all the shots, a low resolution single frame composite was made with all the passes and effects for the whole film. Later, these single frame images were replaced by high-Res image sequence.

PIPELINE

Change is something that cannot be denied in a project. Pipeline is going to make this achieve easier. Setting up a Project folder and Referencing files are the best and simple Pipeline setup which solves most of the issues down the line.

This project is started with low poly primitives, especially the classroom setup. Later stages low polys are replaced with high Poly models with textures. This file is referenced

to the animation file which also has the final rigs of the characters and other props rigs. After inbetween-ing the animation, these referenced files are added with shaders and lights, Render layers. So, the animation file is automatically updated and used for render tests.

Also, the rig file is frequently updated for deformation fixes, light rigs, facial rigs and most importantly hair rig. Every time the animation file reflects these changes which helped these files ready for render. Version-ing up files is a good practice which helped me to go back to previous files, especially when the change done is not desired. The final version up is “_Final.mb” which is always referenced in the animation file. Before overwriting the existing “_Final.mb” file it is copied and renamed with an extension “-Validate.mb”. This step is to make sure the last working file is not lost. These “-Validate.mb” files were also version-ed up with successive number for every update.

Popo_Final_Rig - Validate_1.mb	5/8/2013 8:08 PM	Maya	classRoom_Final - problematicButFinal.mb	9/14/2013 6:28 PM	Maya Binary Fi
Popo_Final_Rig - Validate_2.mb	7/17/2013 7:13 PM	Maya	classRoom_Final - problematicButFinal_1...	9/17/2013 9:45 PM	Maya Binary Fi
Popo_Final_Rig - Validate_3.mb	8/7/2013 9:13 PM	Maya	classRoom_Final - validate1.mb	6/26/2013 6:00 PM	Maya Binary Fi
Popo_Final_Rig - Validate_4.mb	9/13/2013 2:08 PM	Maya	classRoom_Final - validate2.mb	9/2/2013 8:35 PM	Maya Binary Fi
Popo_Final_Rig - Validate_4_meghdad.ma	9/13/2013 2:20 PM	Maya	classRoom_Final - validate3.mb	9/13/2013 2:57 PM	Maya Binary Fi
Popo_Final_Rig - Validate_5.mb	9/14/2013 7:08 PM	Maya	classRoom_Final - Validate4.mb	9/17/2013 11:37 AM	Maya Binary Fi
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Popo_Final_Rig - Validate_8.mb	9/22/2013 9:03 PM	Maya	classRoom_Final - Validate7.mb	9/29/2013 3:35 PM	Maya Binary Fi
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Popo_Final_Rig - Validate_10.mb	9/26/2013 8:10 PM	Maya	classRoom_Final_1.mb	9/11/2013 11:14 PM	Maya Binary Fi
Popo_Final_Rig.mb	9/26/2013 9:18 PM	Maya	classRoom_Final_2.mb	9/12/2013 2:35 PM	Maya Binary Fi
Popo_Final_Rig_1.mb	8/31/2013 5:49 PM	Maya	classRoom_Final_3.mb	9/12/2013 4:12 PM	Maya Binary Fi
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Popo_Final_Rig_3.mb	9/13/2013 2:08 PM	Maya	classRoom_Final_4_meghdad.ma	9/13/2013 2:27 PM	Maya ASCII Fil
Popo_Final_Rig_4.mb	9/13/2013 2:40 PM	Maya	classRoom_Final_5.mb	9/12/2013 11:20 PM	Maya Binary Fi
Popo_Final_Rig_5.mb	9/21/2013 3:28 PM	Maya	classRoom_Final_6.mb	9/14/2013 3:22 PM	Maya Binary Fi
Popo_Final_Rig_6.mb	9/26/2013 8:10 PM	Maya	classRoom_Final_7.mb	9/17/2013 11:37 AM	Maya Binary Fi
Popo_Final_Rig_withLayers.mb	9/22/2013 12:05 AM	Maya	classRoom_Final_8.mb	9/17/2013 12:55 PM	Maya Binary Fi
Popo_hair.mb	9/26/2013 11:55 AM	Maya	classRoom_Final_9.mb	9/22/2013 3:42 PM	Maya Binary Fi
Popo_hairSetup.mb	7/16/2013 9:53 PM	Maya	classRoom_Final_10.mb	9/29/2013 4:05 PM	Maya Binary Fi

Figure 17

MUSIC AND FOLEY

The music is written and composed by Andrew Links from Eastman school of music, University of Rochester, Rochester, NY. He expressed his interest to score music to this film after seeing this flyer.



Figure 18

The character textures were not yet finalized when I made this flyer, but enough for poster. It was a live recording session with the film playing in his iPhone. Foley is done by myself using Zoom Kit in one of the mixing theater at School of Film/ Animation. Mostly, the actions in the film was imitated to match sound for the same timing. The recording was in the wave format at 48 KHz, 24 bit, making sure the level doesn't cross -6DB. Some "whip and whoosh" sounds exceeded -6DB which is taken care in Sound Editing. During editing, some sounds were allowed to exceed -6DB, making sure it is not too loud in comparison with the rest. Adobe Premiere is used for editing sound for its self-explanatory and easy tools, also for its 24 bit audio output. Some Sounds were taken from freesound.org. Sound and Music completes a film and my film is of no exception.

FINAL TWEAKS

There were some final suggestions to consider which made the story read better. Some of them are shuffling shots, splitting the shots into two and inserting a new shot, slowing down animation, texture and color fixes, sound effects corrections for peaks, and adding effect filters for the dream sequence to make it unique. Most important changes which I personally liked was adding a red tone to MoMo's hair and changing the title of this film to "Crush". The working title was "Unfold".

FINALLY the film "Crush" is done and submitted for school screenings. But till now no one noticed that my characters don't blink during the film. My committee member "Shaun foster" is an exception to it.

Appendix A: Original story pitch

Unfold (working title)

The school bell rings. The classroom is empty except for two students. A girl sits at her desk puzzling over the math examples written on the front board. A couple of rows over the boy sits, mooning over her in infatuation.

Struck with inspiration he tears a page from the notebook in front of him and furiously begins folding the page. He holds up an origami frog that looks much like him. Its arms are folded over its chest and when he opens it, it reveals a red heart symbol. He sighs and flicks it towards her desk.

The frog flies across the room as if jumping. The frog morph into cupid's arrow leaving a trail of valentine hearts in the air then morphs back. It lands on her desk. She picks it up, opens the arms and smiles.

The boy sighs again at her reaction and settles into his imagination. The world transforms into an origami garden. The girl becomes an idealized model in paper and in her hands the frog's heart beats. An origami bird lands near him and blows shimmering bubbles as it sings to him. He pops the bubbles with his finger with a transcendent smile on his face. He is radiant.

Back in reality the girl's smile fades as she watches him stabbing his finger into empty space with a dopey smile.

Back in the origami-garden he pirouettes to a bush and with great flourish, picks a rose and places it in his teeth. He leaps to mount a unicorn and rides it across the garden to her. He springs into the air to dismount – into the whirling blades of a ceiling fan.

Back in reality the girl recoils from the sight of him plopped on the floor with a broomstick between his legs and a broken pencil in his mouth. The damaged ceiling fan

	FALL 2012	WINTER 20 12	SPRING 20 13	FALL 20 13
WEEKS	1 2 3 4 5 6 7 8 9 10	1 2 3 4 5 6 7 8 9 10	1 2 3 4 5 6 7 8 9 10	1 2 3 4 5 6 7 8 9 10 11
PRE PRODUCTION				
Script	■			
Story Board	■			
Animatic with rough Sound	■			
Character Design	■			
Character Model and UV	■			
Prop design	■			
Character Rigging	■			
PRODUCTION				
Weeks	1 2 3 4 5 6 7 8 9 10	1 2 3 4 5 6 7 8 9 10	1 2 3 4 5 6 7 8 9 10	1 2 3 4 5 6 7 8 9 10 11
Props Modeling		■		
Texturing and lookdev		■		
Staging		■		
Animation		■		
POST PRODUCTION				
Weeks	1 2 3 4 5 6 7 8 9 10	1 2 3 4 5 6 7 8 9 10	1 2 3 4 5 6 7 8 9 10	1 2 3 4 5 6 7 8 9 10 11
Animation			■	
Lighting			■	
Rendering & Rough Edit			■	
Music			■	
Foley			■	
Re - Rendering & Rough Edit			■	
Finding a responder				■
Compositing				■
Final Output				■
Screening with responded				■

Appendix C: Budget

	COST	IN KIND	TOTAL
PRE-PRODUCTION			
Story and Script		Yes	\$0
Software Adobe CS4 package	\$800	Yes	\$0
Supplies	\$100	No	\$100
Computer	\$2,000	Yes	\$0
Wacom tablet	\$800	No	\$800
cannon 5D	\$1,300	Yes	\$0
External Hard Drive	\$150	No	\$150
PRODUCTION			
Autodesk Maya	\$3,500	Yes	\$0
POST-PRODUCTION			
Sound Effects	\$100	Yes	\$0
Music Composer	\$500	Yes	\$500
After effects	\$800	Yes	\$0
Blu-ray discs+ regular DVD	\$100	No	\$100
Postage	\$40	No	\$40
Festival Fees	\$200	No	\$200
Contingency 10%	\$150	No	\$150
TOTAL			\$2,040

Appendix D: Screening response by Dave Sluberski | Lecturer | School of Film & Animation

- On first viewing, you hear the fan blades and it's like the whooshing of a heartbeat.
- As I watched this over and over and over, this reminds me of an onion, the fan blades are slicing. Will it cut your throat or cut you a break? It's an executioner's blade. You go to slice an onion and it creates tears; you start crying. But you know, in the end, it's a basis for a wonderful dish.
- This film, CRUSH, has as many layers as an onion: it crushes his hopes, his heart, the paper. Also, he has a crush – first on one girl, then at the end, another. This guy folds up his emotions, throws it into the air, and takes a chance, hoping

to deliver Cupid's arrow. There's a reaction from the girl, which creates a world for him which is bigger than life.

- He's on Cloud 9, his head is spinning and so is the fan! Then all of a sudden, the two worlds collide, and he's back to hard reality. A bouquet turns into a broom – so much for sweeping her off her feet!
- He's just been CRUSHED. His world goes pale and his heart has been trashed, literally and figuratively.
- Suddenly he sees the light and there's a gleam in his eye: a new girl with a slight wink and a fresh attitude!
- He's airborne again! It proves the old saying: "Hope springs eternal in the human breast." (from Alexander Pope's "An Essay on Man")

I watched this film about ten times, and it's fresh every time.

Looking at a guy taking a chance and getting your heart ripped out of your chest, this hits home.

There was a Simpsons episode where Bart had a crush on a girl, and suddenly, while he's fantasizing much like this guy, he's rejected and her hand goes right into his chest, grabs his beating heart, rips it out of his chest (complete with the killer sound effects!), and says, "Ya won't be needing this anymore!" This film has delivered on that level!

He has captured every nuance of that emotion, at least from my point of view as a guy. On my first viewing, it took me a few minutes to get used to the style and personality of this boy: the exaggerated tooth was maybe a little bit much for me initially, but I was able to quickly accept it as a part of the boy's stark individuality.

I don't know if Tiru has had any past heartaches or paper cuts, but congratulations, because he just got married several weeks ago!

Appendix E: Production snapshots





